FIG. 1

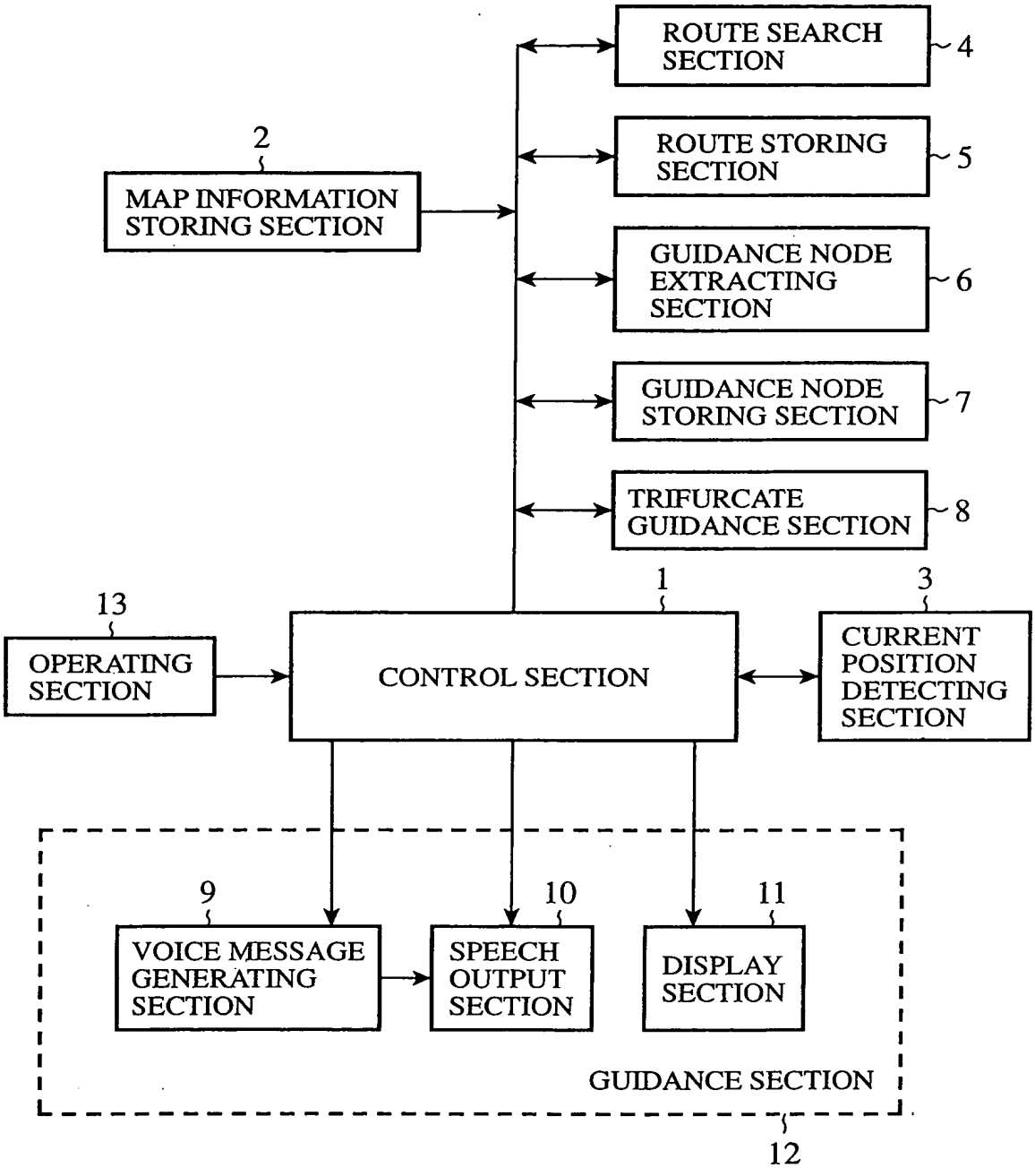

ROUTE SEARCH SECTION
4
2
MAP INFORMATION STORING SECTION
ROUTE STORING SECTION
5
GUIDANCE NODE EXTRACTING SECTION
6
GUIDANCE NODE STORING SECTION
7
TRIFURCATE GUIDANCE SECTION
8
1
3
13
OPERATING SECTION
CONTROL SECTION
CURRENT POSITION DETECTING SECTION
9
10
11
VOICE MESSAGE GENERATING SECTION
SPEECH OUTPUT SECTION
DISPLAY SECTION
GUIDANCE SECTION
12

FIG.2

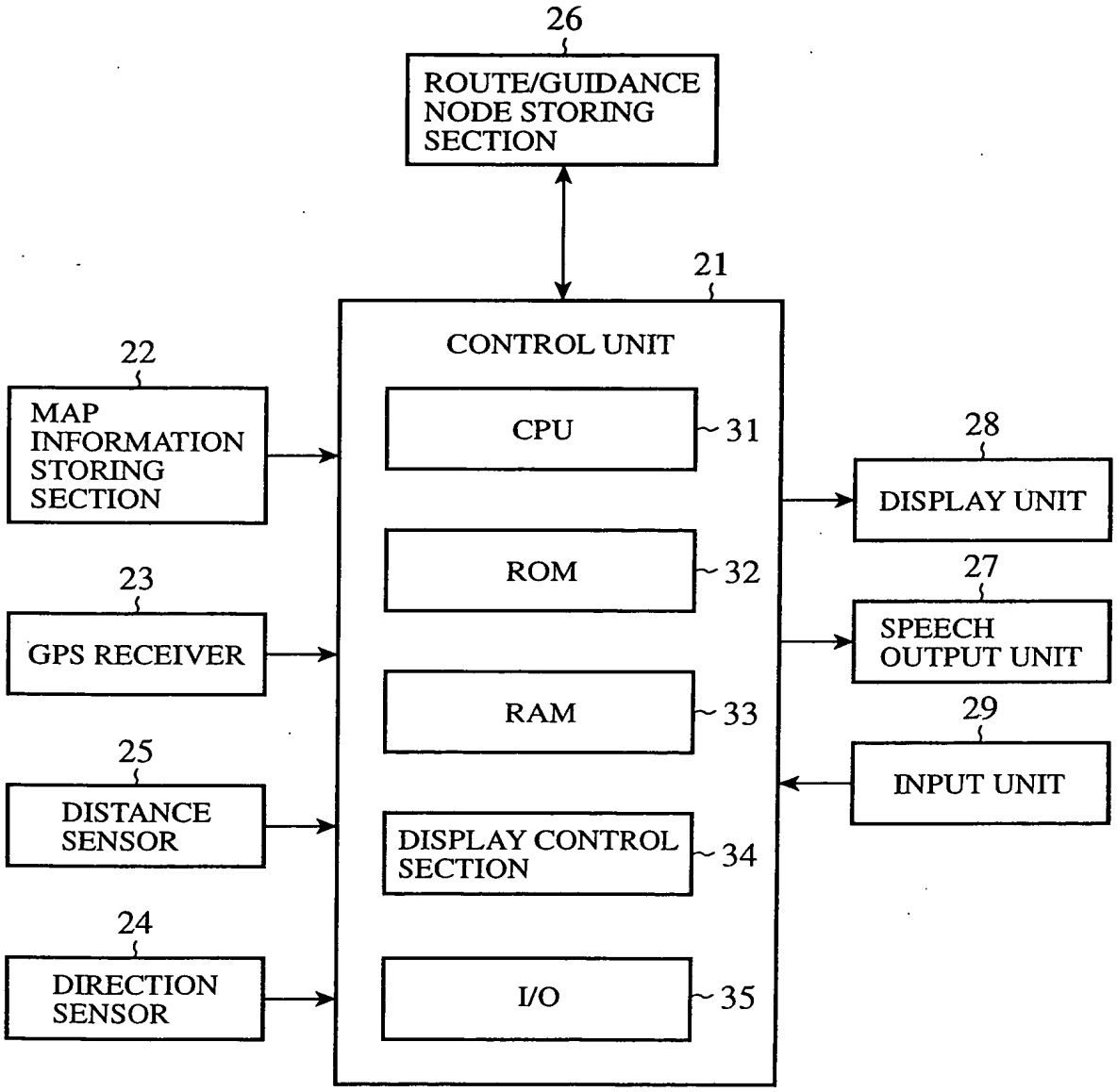

26
ROUTE/GUIDANCE NODE STORING SECTION
21
CONTROL UNIT
22
MAP INFORMATION STORING SECTION
CPU
31
28
DISPLAY UNIT
ROM
32
23
27
GPS RECEIVER
SPEECH OUTPUT UNIT
RAM
33
29
25
INPUT UNIT
DISTANCE SENSOR
DISPLAY CONTROL SECTION
34
24
DIRECTION SENSOR
I/O
35

FIG.3

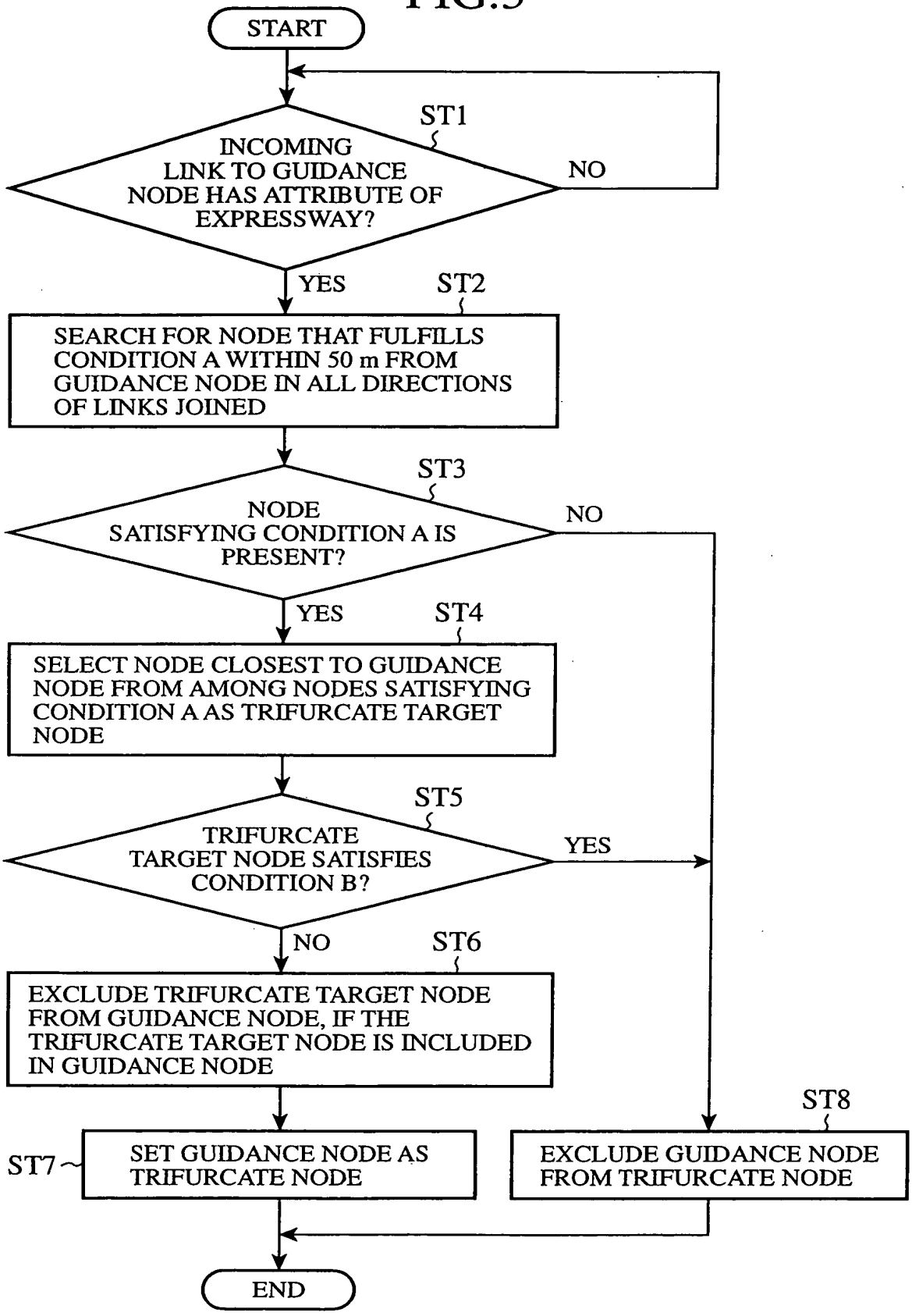

START
ST1
INCOMING LINK TO GUIDANCE NODE HAS ATTRIBUTE OF EXPRESSWAY?
NO
YES
ST2
SEARCH FOR NODE THAT FULFILLS CONDITION A WITHIN 50 m FROM GUIDANCE NODE IN ALL DIRECTIONS OF LINKS JOINED
ST3
NODE SATISFYING CONDITION A IS PRESENT?
NO
YES
ST4
SELECT NODE CLOSEST TO GUIDANCE NODE FROM AMONG NODES SATISFYING CONDITION A AS TRIFURCATE TARGET NODE
ST5
TRIFURCATE TARGET NODE SATISFIES CONDITION B?
YES
NO
ST6
EXCLUDE TRIFURCATE TARGET NODE FROM GUIDANCE NODE, IF THE TRIFURCATE TARGET NODE IS INCLUDED IN GUIDANCE NODE
ST7
SET GUIDANCE NODE AS TRIFURCATE NODE
ST8
EXCLUDE GUIDANCE NODE FROM TRIFURCATE NODE
END

FIG.4

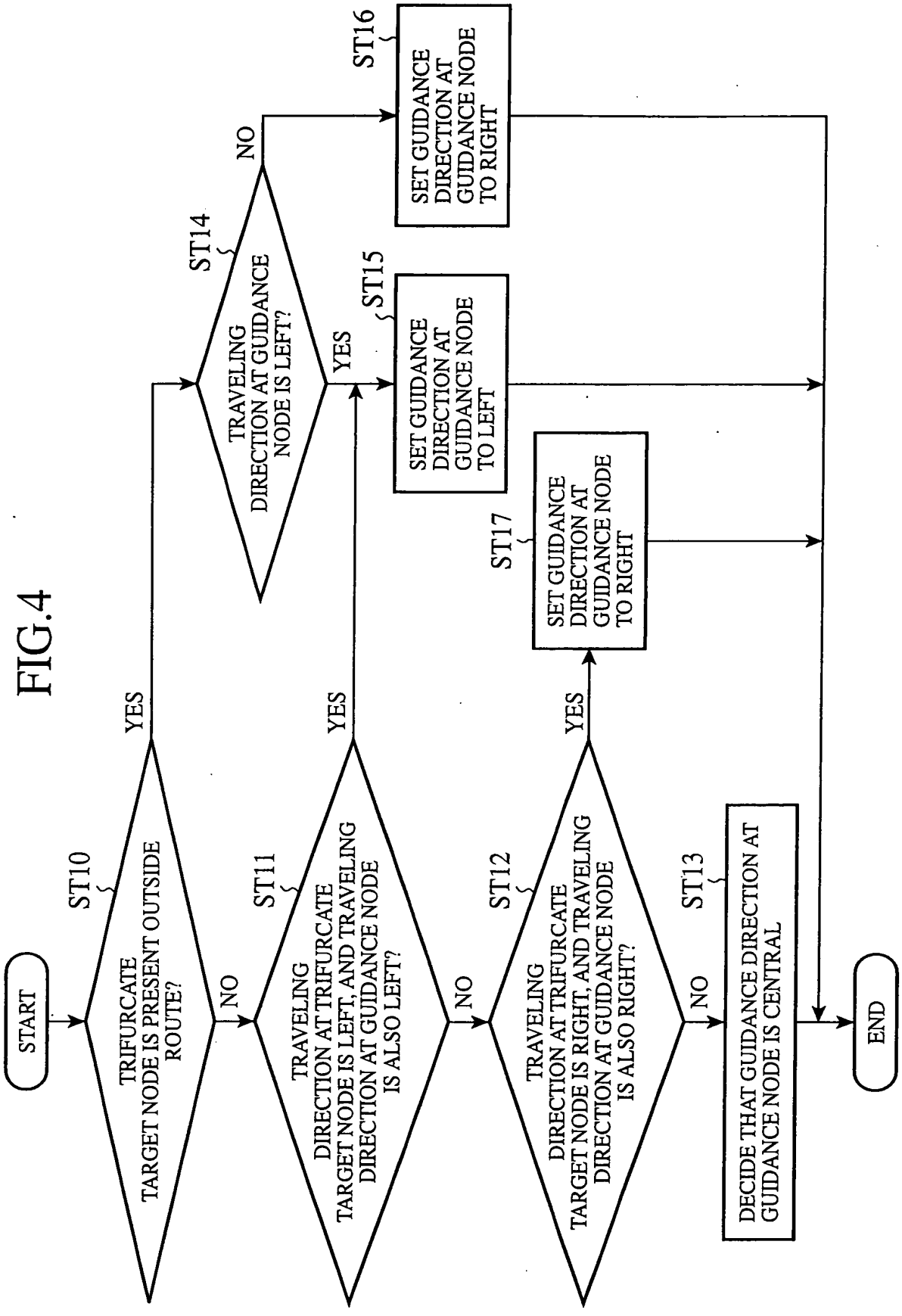
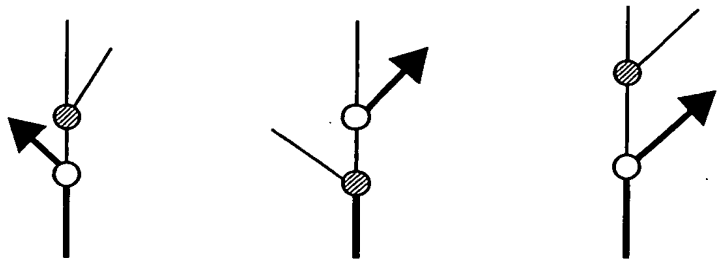

START
ST10
TRIFURCATE TARGET NODE IS PRESENT OUTSIDE ROUTE?
YES
NO
ST11
TRAVELING DIRECTION AT TRIFURCATE TARGET NODE IS LEFT, AND TRAVELING DIRECTION AT GUIDANCE NODE IS ALSO LEFT?
YES
NO
ST12
TRAVELING DIRECTION AT TRIFURCATE TARGET NODE IS RIGHT, AND TRAVELING DIRECTION AT GUIDANCE NODE IS ALSO RIGHT?
YES
NO
ST13
DECIDE THAT GUIDANCE DIRECTION AT GUIDANCE NODE IS CENTRAL
END
ST14
TRAVELING DIRECTION AT GUIDANCE NODE IS LEFT?
YES
NO
ST15
SET GUIDANCE DIRECTION AT GUIDANCE NODE TO LEFT
ST16
SET GUIDANCE DIRECTION AT GUIDANCE NODE TO RIGHT
ST17
SET GUIDANCE DIRECTION AT GUIDANCE NODE TO RIGHT

FIG.5A FIG.5B FIG.5C



○ : GUIDANCE NODE

◍ : EXTRACTED NODE

FIG.6

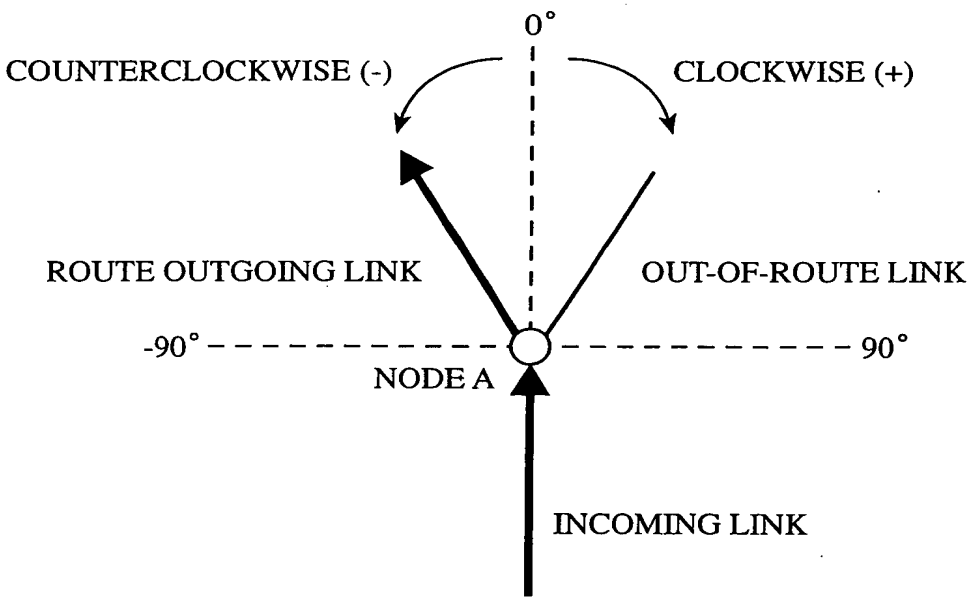


FIG.7

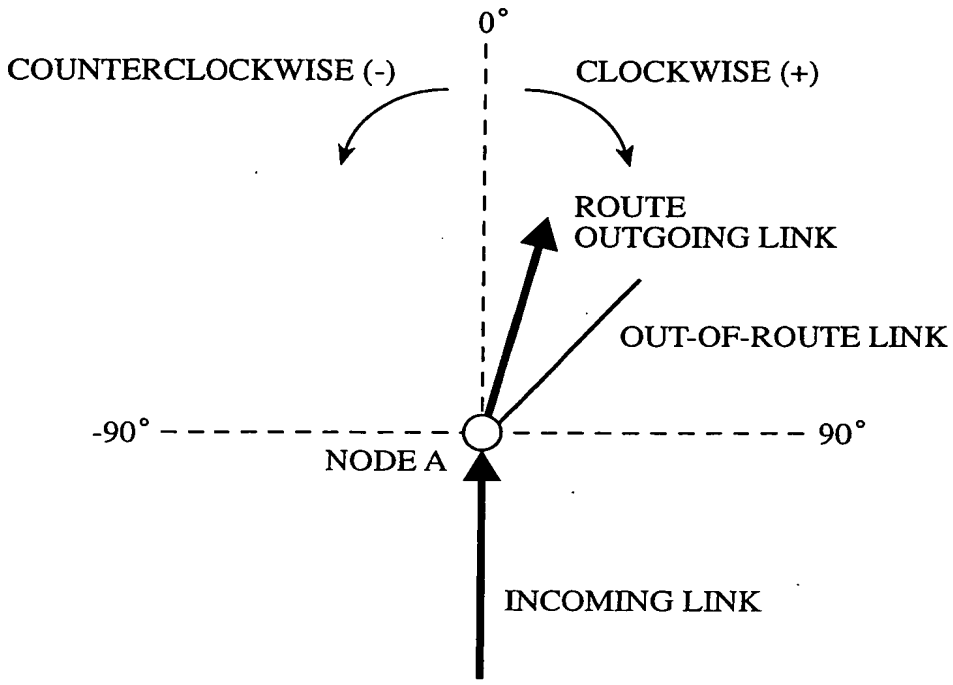

0°
COUNTERCLOCKWISE (-)
CLOCKWISE (+)
ROUTE
OUTGOING LINK
OUT-OF-ROUTE LINK
-90°
90°
NODE A
INCOMING LINK

FIG.8

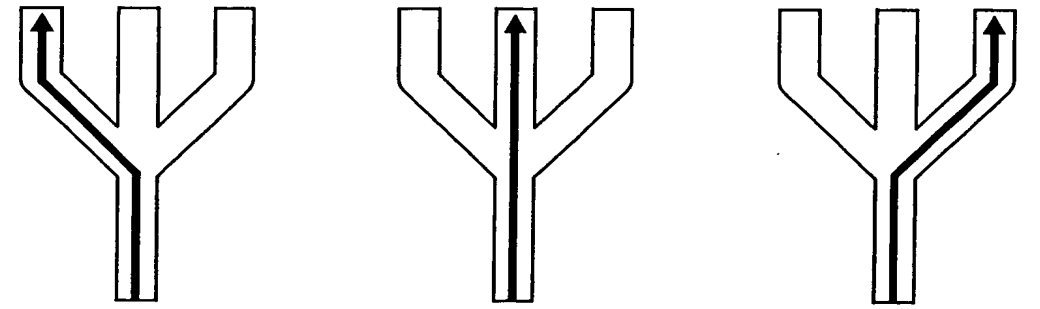

LEFT DIRECTION
CENTRAL DIRECTION
RIGHT DIRECTION

FIG.9

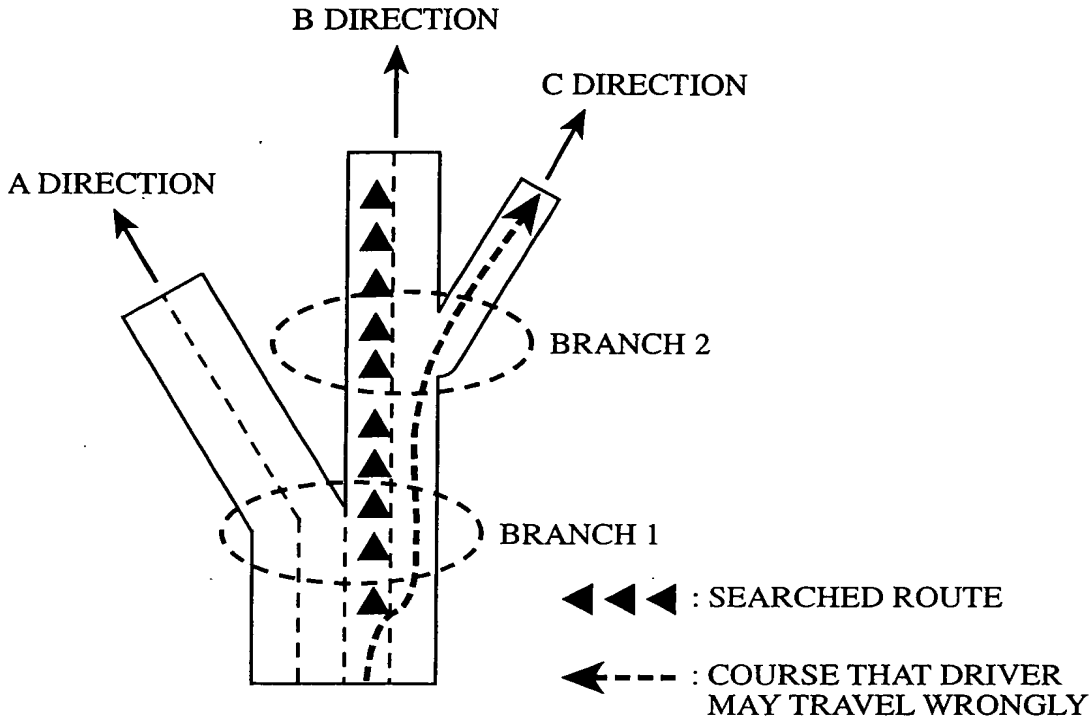
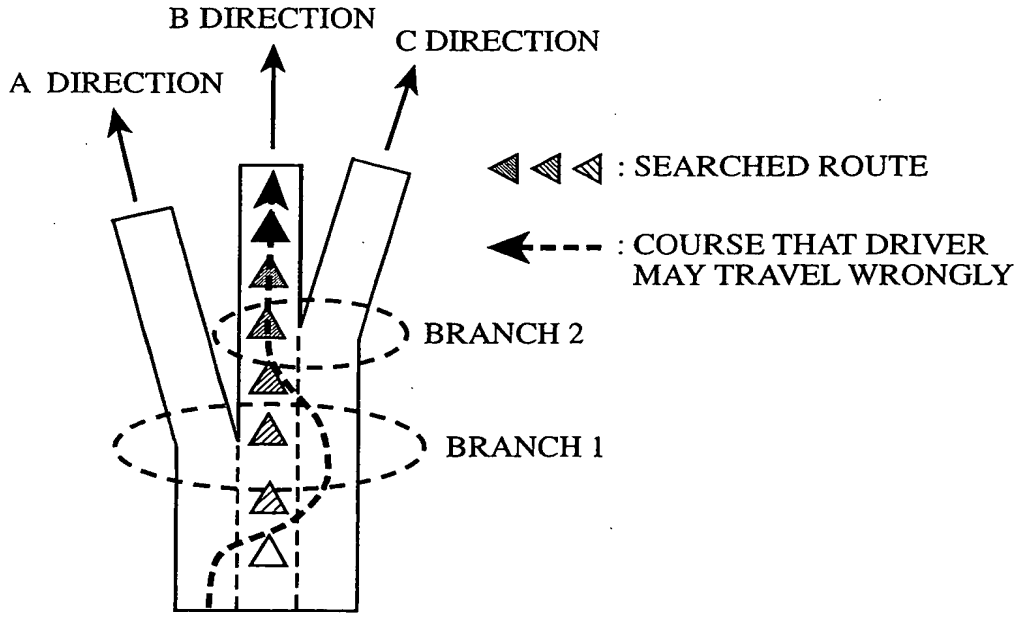

B DIRECTION
C DIRECTION
A DIRECTION
BRANCH 2
BRANCH 1
: SEARCHED ROUTE
: COURSE THAT DRIVER MAY TRAVEL WRONGLY

FIG.10


B DIRECTION
C DIRECTION
A DIRECTION
: SEARCHED ROUTE
: COURSE THAT DRIVER MAY TRAVEL WRONGLY
BRANCH 2
BRANCH 1